

## Hawaii QuarkNet activities -- Sept. 2011 to Aug. 2012

The Hawaii QuarkNet group met in Jan., April, and Aug. 2012. The 21 January meeting was in Peter Grach's classroom at Kamehameha H.S. Mike Jones started with an overview of data from the 4 Hawaii detectors and described the status of the Maui and UH Windward detectors. Hanno Adams described operation of the Punahou detector and plans for student projects. Peter Grach described plans to have about

Fifty of his students analyze QuarkNet data and make posters for e-Lab. Mike Weber reported that the BYU-Hawaii detector was not working reliably and that the GPS and DAQ would be returned to Fermilab. Selene Michihara described a project done by one of her students using the LBL-design portable detector. Jason Kumar was unable to attend but provided a written summary of LHC status and the recent puzzling result from the OPERA experiment. It was decided to have the next meeting at Kamehameha H.S. so that some of Peter's students could report on their projects in person.

The 14 April meeting began with 3 of Peter's students describing their projects. Topics included possible correlations with solar activity, ozone levels, and altitude. Peter explained that about 60 students in his basic physics classes would spend 3 weeks learning about cosmic rays, analyzing e-Lab data, writing a journal, and uploading posters. (32 posters were uploaded between 19 and 30 April.) Hanno described the status of the Punahou detector.

The anomalously high flux values in February were due to having PMT voltages at the maximum values. Flux values returned to their previous levels in March after the PMT voltages were reset.

Tiffany Coke did not attend but previously had sent email with the guidelines for projects for her students. Keith Imada did not attend so Mike Jones reported on the Maui detector. The flux values were mostly stable in Feb. but no data were uploaded in March and very little so far in April. Jacob Hudson noted that construction and power glitches may have caused problems for the UH Windward detector. There was a sudden 10% drop in flux values in late Jan. followed by a slow increase. This drop was associated with a drop in the channel 1 singles rate. After a 20 V increase in the PMT voltage for channel 1 on 9 March, the flux values returned to their previous levels. Kris Whelan reported news from QuarkNet national including plans to have a cosmic ray masterclass at BYU-Hawaii in Fall 2012. Jason Kumar discussed his written handout on the LHC and the status of the OPERA experiment.

There have been significant developments since the April meeting.

Tiffany Coke's students uploaded 29 posters to e-Lab. Mike Weber adjusted threshold voltages using the new DAQ and has been taking data since mid-May. Tiffany went to CERN for the high school teachers summer program in July. Hanno and Jeanine Nakakura attended the boot camp at Fermilab in July.

The 25 Aug. meeting was held in Selene's classroom at Kahuku H.S.

The main topics were posters done by students of Peter and Tiffany and reports of summer programs -- Tiffany at CERN and Jeanine and Hanno at Fermilab. A common problem with the posters is that students tried to compare data from different sites but which had different geometries and/or different coincidence settings. It seems desirable to identify data sets with nearly the same geometry and coincidence settings. Peter has a student who wants to do a project on muon decay so it would also be useful to identify appropriate data sets. Tiffany reported that the CERN program was excellent and had additional excitement due to the Higgs search announcements. Jeanine and Hanno reported on their groups' analyses of data on W and Z decays. Mike Weber gave a status report on the BYU-Hawaii detector. Selene mentioned potential projects for some of her students and demonstrated the portable LBL-design detector. Jacob reported that the UH Windward detector was running steadily except for

occasional power outages. He may have a student to analyze e-Lab data. Jason provided a report on the Higgs search at the LHC. Finally, we discussed plans for a cosmic ray masterclass on 20 Oct. at BYU-Hawaii. Two new faculty at UH Manoa joined the meeting and plan to be involved in future activities.

The currently active Hawaii teachers are as follows:

Tiffany Coke     Punahou H.S.  
Hanno Adams     Punahou H.S.  
Selene Michihara   Kahuku H.S.  
Peter Grach     Kamehameha H.S.  
Jacob Hudson     Hawaii School for Girls at La Pietra & UH Windward C.C.  
Keith Imada     Maui H.S.  
Jeanine Nakakura   Hawaii DOE Resource Teacher, Aiea Elem. School  
Mike Weber     Brigham Young Univ. Hawaii  
Jason Kumar     UH Manoa  
Jelena Maricic     UH Manoa  
Radovan Milincic   UH Manoa

Derek Minakami moved from the classroom to an administrative position and was inactive for 2009-2012. He will likely remain inactive.

Nathan Patla left Hawaii at the end of the 2011-2012 academic year.

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## Appendix

long-term flux plots in UHManoa area of saved plots on e-Lab

UH Windward -- DAQ 6100

wcc2009fix : March-Dec. 2009 in 24-hour bins

wccall2010 : Jan.-Dec. 2010 in 24-hour bins

    Note slow variation and anomaly in Oct.

wcc1janto11jun2011 : Jan.-June 2011 in 8-hour bins

    Note instability due to channel 4 29 March to 4 May.

    Stability returned after swapping voltage cables

    for channels 3 and 4 on 4 May.

wcc1julyto17dec2011 : July-Dec. 2011 in 8-hour bins

    Note small but significant drop in flux in late Sept.

wccjanapr2012 : Jan.-April 2012 in 8-hour bins

    20V increase for channel 1 on 9 March

BYU-Hawaii -- former Punahou DAQ 5049 starting Jan. 2011

    DAQ 5049 sent back to Fermilab Jan. 2012

    DAQ 6773 installed April 2012

byuh2008 : Jan.-Dec. 2008 in 24-hour bins

byuh22janto14jun2011 : Jan.-June 2011 in 8-hour bins

    New transformer installed Jan. 2011.

    Note instability due to channel 4 on 25 Feb. and 15-17 March.

Stability returned after swapping voltage cables  
for channels 3 and 4 on 18 March.

byuh15juntto6aug2011 : mid-June to early Aug. 2011 in 1-hour bins

Note instability starting in July.

New transformer installed 9 Aug. 2011.

byuh9augto17nov2011 : Aug.-Nov. 2011 in 8-hour bins

voltage adjustments for PMTs 3 & 4 in Oct.

Punahou -- new DAQ 6432 starting April 2010

punahou2008 : March-Dec. 2008 in 24-hour bins

punahouapr10tojun2011 : April 2010 to June 2011 in 24-hour bins

Note instability due to channels 1 and 2 started

on 7 March. New voltage box installed 27 April.

punahoujunetodec2011 : June to Dec. 2011 in 8-hour bins

sudden flux drop on 21 Dec. after lowering PMT voltages

punahoujanapr2012 : Jan.-April flux in 8-hour bins

Maui -- DAQ 6231, Haleakala Oct. 2008 to June 2010,

Maui HS Aug. 2010 to ?

maui13janto9jun2011 : Jan.-June 2011 in 8-hour bins

New transformer installed Jan. 2011.

New geometry file for new location starting 15 March

installed on 19 April.

Detector moved on 1 June. Reduced flux for

2-13 June due to vertical misalignment.

mauijune2011tojan2012 : June 2011 to Jan. 2012 in 8-hour bins

New transformer installed 21 Oct. 2011.

mauijanapr2012 : Jan.-April flux in 8-hour bins